PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improved Ice Mould

I, EUGEN WILBUSHEWICH, of Rotelstrasse 61, Postfach Zurich 23, Switzerland, an Israeli citizen, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention refers to an ice mould having an upright body of rectangular or square cross section and provided with a mould-closing bottom flap which, to permit the downward passage of the frozen goods on harvesting, can tilt open around a horizontal axis lying parallel to one mould wall.

In certain ice producing methods, e.g. according to British Patent No. 718,240, it is advantageous tightly to freeze-close the ice mould by freezing on the bottom flap all along the bottom flange of the mould. Subsequent release of the flap from the mould walls following the freezing solid of the contents of the mould can be effected by quickly warming up the mould walls, or by mechanically tearing open the freeze-seal by use of the forces due to elongation of the contents, during freezing. In the above methods there is a tendency for the mould contents to freeze on to the upper central part of the flap and prevent the emergence of the frozen block downwards, because either the flap cannot open at all or only by breaking the block and leaving on the surface of the flap a frozen-on hump, this hump thereafter interfering with the free sliding movement of the frozen block along the flap. However, for the automatic functioning of an ice block plant it is important that the bottom flap of the individual moulds will open up as soon as the frozen mould content becomes thawed free from the mould walls.

Attempts have been made to prevent the freezing of the mould contents to the bottom flap, by providing on its upper surface, a coat of ski wax, ski lacquer, resin lacquer, or the like; but after the passage of a few blocks only when emerging from the mould, it has been found that this coat was wiped away. According to another suggestion, the bottom flap may be thawed free from the adhering mould contents by playing a warm water jet against its outside, but this is a cumbersome and costly method.

According to the invention an ice mould is provided with a square or rectangular cross section with its walls arranged about a vertical axis for the discharge of the contents of the mould downwardly and a hinged flap for closing the bottom of the mould and for permitting the harvesting of the contents thereof after freezing, said flap having on its inner side a raised surface extending around the margin of the flap and which in the closed position thereof engages with the bottom of the mould walls, said surface projecting inwardly beyond at least those walls of the mould at right angles to the hinge axis of the flap, the recess formed by the remaining part of the inner side of the flap being provided with a surface having non-ice adhering properties.

Further according to the invention an ice mould has its wall or walls arranged about a vertical axis for the discharge of the contents of the mould downwardly and a hinged flap for closing the bottom of the mould and for permitting the harvesting of the contents thereof after freezing, said flap having on its inner side a raised surface extending around the margin of the flap and which in the closed position thereof engages with the bottom of the mould wall or walls, the recess formed by the remaining part of the inner side of the flap being provided with a surface having non-ice adhering properties.

Thus, with the bottom flap in the closed position, the upper raised surface thereof can be frozen tight to the bottom of the mould walls. Upon the contents of the mould freezing solid the block will not adhere to the area surrounded by the raised surface of the flap consequently there is nothing to hinder the

opening of the flap. The edge of the block produced by the mould contents which is parallel to the tilting axis, of the flap will then engage the two portions of the raised part of the flap surface that project somewhat to the inside of those walls of the mould which are at right angles to the tilting axis, with the result that the frozen block will no longer come into contact with the lower part of the flap surface and will not wipe across its non-freezing surface area.

The accompanying drawings show by way of example a preferred embodiment of the invention. In the drawings:

Fig. 1 is a sectional elevation of the lower part of the mould walls with the bottom flap closed,

Fig. 2 is a plan view of the flap (seen from above).

The freezing space 1 has a square cross section, and is somewhat splayed downwardly. It is surrounded by four flat walls 2, 3, 4 and 5 which at their lower part are jacketed by a refrigerant evaporator space 6, closed at the outside by second walls 7. To the mould walls 2—5 are welded arced sheets 8, their lower ends being welded between said walls and the outer walls 7, to define with the mould walls 2—5 a number of evaporator channel spaces 9 running from the evaporator space upwards, their top ends being connected to a refrigerant collector (not shown). Into the space formed by the evaporator space 6 and the channels 9 leads further, an inlet pipe (not shown) for liquid refrigerant or moist refrigerant vapour; furthermore, from the evaporated space 6 an outlet for liquid refrigerant leads downwards; this too, is not shown in the drawing.

Below and parallel to one wall 2 of the ice mould, is provided a horizontal hinge pin 10. On this pin 10 a bottom flap 11 is hingedly mounted and urged by means such as springs or a counterweight (not shown) against the ice mould walls 2—5 so as to close the bottom of the freezing space of the ice mould. The top surface of the flap 11 has a raised outer part 12 which lies, all around, against the mould walls when the flap is closed.

In addition this raised part projects into the space defined by the four walls 2—5 of the mould, although in accordance with an alternative embodiment, it need only project towards the inside space on the sides adjacent the two mould walls 3 and 5, i.e. those lying at right angles to the hinge axis 10 of the bottom flap.

The lower surface 13 of the flap surrounded by the above mentioned raised part 12, comprises an ebony plate 14; it is let into a stepped part 15 of the metal, e.g. aluminium, body of the bottom flap 11 and joined thereto by means of cementing means. The height of the step 15 is greater than the thickness of the ebony plate 14, resulting in the surface of said plate lying below that of the raised part 12.

In operation, the mould flap 11 is wetted with the liquid to be frozen and, at the same time, the mould walls are cooled downby letting refrigerant media evaporate in the space 6 and the evaporation channels 9. The raised surface 12 of the bottom flap 11 will thus become tightly and securely frozen to the mould walls 2—5. The freezing space 1 can now be filled with the liquid to be frozen, e.g. water. Continued evaporation of refrigerant in the spaces 6 and 9 will eventually freeze solid the liquid in the freezing space 1, to form an ice-block. The block on freezing, however, will adhere to the mould walls 2—5 but not to the ebony surface of the recessed part of the flap's surface. The liquid will finally freeze up near the bottom flap 11 and, in so doing, will tear open the flap due to elongation of the frozen contents in a downward direction, breaking the ice seal between mould walls and bottom flap.

Subsequently the cold, evaporating refrigerant in the spaces 6 and 9 is replaced by warm, gaseous refrigerant. This will warm up the mould walls 2—5 to such a degree that the frozen mould contents is thawed free and, consequently, will rest with its full weight on the flap 11. Because the flap becomes free all round, with no ice adhering, it will be pushed open and tilted around its axis 10 by the emerging frozen block, overcoming the forces tending to keep the flap closed. As is shown in Fig. 1, for two positions illustrated by dot-dash lines, the frozen block will now engage the flap surface only with its edge 17 lying parallel to the tilting axis 10 sliding along the inwardly projecting surfaces 12^{1} and 12^{11}, inside the space of the walls 3 and 5, of the raised surface 12, and will not rub over the ebony plate 14.

The ice block dropping out of the mould will then be received by means not shown, e.g. a trolly with lowerable top, or a chute, and removed from under the mould.

Instead of providing in the step recess 15 of the bottom flap an ebony plate 14, a layer of ski wax, ski lacquer, or another freeze preventing material can be applied. Alternatively, the plate could be made of polytetrafluoroethylene (known under the registered Trade Mark "Teflon"), or chlorophene-rubber (known under the registered Trade Mark "Neopren").

As was mentioned in the above named patent Specification, the bottom flap can be provided with oblong holes by which it is journalled on the axis 10, and the means effecting the tilt against the mould flange can be arranged in a way that they not only will tilt the flap 11 into its horizontal position around the axis 10, but also, consequently, lift the complete flap towards the mould flange whilst maintaining it horizontal. Later, the flap whilst being maintained horizontally will also be

pushed parallel to its plane downwards by the freezing.

Also, the ice mould may be provided with one or more tubular evaporators depending from above, into the freezing space.

WHAT I CLAIM IS:—

1. An ice mould having a square or rectangular cross section with its walls arranged about a vertical axis for the discharge of the contents of the mould downwardly and a hinged flap for closing the bottom of the mould and for permitting the harvesting of the contents thereof after freezing, said flap having on its inner side a raised surface extending around the margine of the flap and which in the closed position thereof engages with the bottom of the mould walls, said surface projecting inwardly beyond at least those walls of the mould at right angles to the hinge axis of the flap, the recess formed by the remaining part of the inner side of the flap being provided with a surface having non-ice adhering properties.

2. An ice mould having its wall or walls arranged about a vertical axis for the discharge of the contents of the mould downwardly and a hinged flap for closing the bottom of the mould and for permitting the harvesting of the contents thereof after freezing, said flap having on its inner side a raised surface extending around the margin of the flap and which in the closed position thereof engages with the bottom of the mould wall or walls, the recess formed by the remaining part of the inner side of the flap being provided with a surface having non-ice adhering properties.

3. An ice mould according to claim 1 wherein the surface of said recess is coated with wax or other non-ice adhering material, said coating having a thickness less than the depth of said recess.

4. An ice mould according to claim 1 wherein an insert or rigid or semi-rigid material is located in said recess, said insert having a thickness less than the depth of said recess.

5. An ice mould according to claim 4 wherein said insert is formed of wood.

6. An ice mould substantially as hereinbefore described with reference to the accompanying drawings.

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863603 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

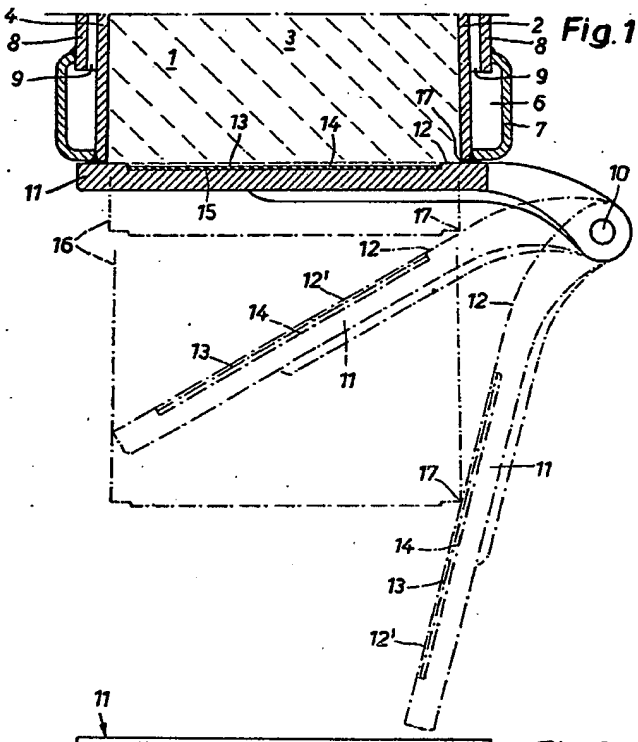

Fig. 1

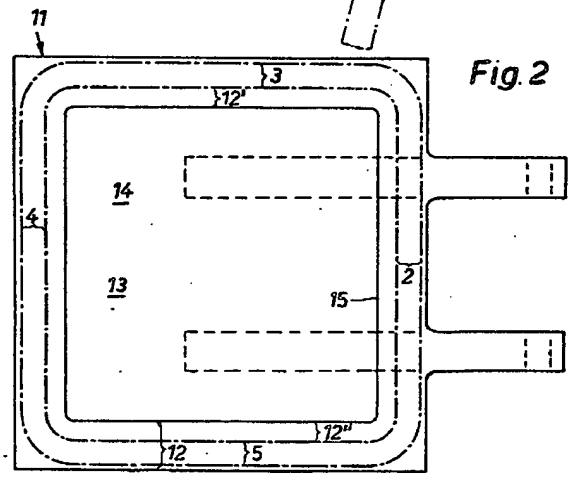

Fig. 2